2017

Tractor Test 2175: Claas Xerion 5000 CVT

Nebraska Tractor Test Laboratory

NEBRASKA OECD TRACTOR TEST 2175 - SUMMARY 1089
CLAAS XERION 5000 DIESEL
CONTINIOUSLY VARIABLE TRANSMISSION

Location of tests: Nebraska Tractor Test Laboratory, University of Nebraska, Lincoln, Nebraska 68583-0832

Dates of tests: April 25 - 28, 2017

Manufacturer: CLAAS Selbstfahrende Erntemaschinen GmbH, 33428 Harsewinkel, Germany

CONSUMABLE Fluids, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F *(15°/15°C)*** 0.8411 **Fuel weight** 7.003 lbs/gal *(0.839 kg/l)* **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal *(1.087 kg/l)* **Oil SAE** 10W40 **API service classification** CJ-4 **Transmission lubricant** Agrishift XE fluid **Hydraulics, front and rear axle lubricant** Claas Agrihyd HVLPD fluid **Final drive lubricant** MT 80W-90 API GL 5 **Total time engine was operated:** 19.5 hours

ENGINE: Make Mercedes-Benz Diesel **Type** six cylinder vertical with turbocharger, air to air intercooler and D.E.F. (diesel exhaust fluid) exhaust treatment **Serial No.** 471.919-C-0262520 **Crankshaft** lengthwise **Rated engine speed** 1900 **Bore and stroke** 5.197" x 6.142" *(132.0 mm x 156.0 mm)* **Compression ratio** 17.3 to 1 **Displacement** 781 cu in *(12810 ml)* **Starting system** 24 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, separate radiators for hydraulic, transmission, front axle and rear axle oils **Fuel filter** two paper elements **Exhaust** DOC (diesel oxidation catalyst) and SCR (selective catalyst reduction) within a horizontal muffler with vertical outlet **Cooling medium temperature control** thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 170.2 - 176.8 lb/h *(77.2 - 80.2 kg/h)* **High idle:** 1910 - 1930 rpm (Drawbar operations - 1850 - 1890 rpm) **Turbo boost:** nominal 31.9 - 34.8 psi *(220 - 240 kPa)* as measured 33.6 psi *(232 kPa)*

CHASSIS: Type rigid frame four wheel drive with duals **Serial No.** *78300446* **Tread width** rear 89.2" *(2265 mm)* and 159.8" *(4060 mm)* front 89.2" *(2265 mm)* and 159.8" *(4060 mm)* **Wheelbase** 141.7" *(3600 mm)* **Hydraulic control system** direct engine drive **Transmission** Infinitely variable with four mechanical ranges and automatic shifting between ranges **Nominal travel speeds mph *(km/h)*** forward - 0 - 31 mph, *(0 - 50 km/h)* reverse - 0 - 31 mph *(0 - 50 km/h)* **Clutch** a foot pedal controls the hydrostatic oil flow **Brakes** wet disc hydraulically operated by foot pedal **Steering** electro- hydraulic with the ability to steer front and rear axles independently or coordinated

POWER TAKE-OFF PERFORMANCE

Power HP *(kW)*	Crank shaft speed rpm	Diesel Consumption Gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	D.E.F. Consumption Hp.hr/gal *(kW.h/l)*	D.E.F. Consumption Gal/hr *(l/h)*	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION						
Rated Engine Speed—(PTO speed—1098 rpm)						
445.84 *(332.46)*	1899	24.71 *(93.54)*	0.388 *(0.236)*	18.04 *(3.55)*	0.82 *(3.11)*	
Standard Power Take-off Speed (1000 rpm)						
474.61 *(353.92)*	1729	25.05 *(94.82)*	0.370 *(0.225)*	18.95 *(3.73)*	0.82 *(3.09)*	
Maximum Power (1 hour)						
478.23 *(356.62)*	1650	24.86 *(94.12)*	0.364 *(0.221)*	19.23 *(3.79)*	0.79 *(2.98)*	
VARYING POWER AND FUEL CONSUMPTION						
445.84 *(332.46)*	1899	24.71 *(93.54)*	0.388 *(0.236)*	18.04 *(3.55)*	0.82 *(3.11)*	Air temperature
379.98 *(283.35)*	1902	20.92 *(79.17)*	0.385 *(0.234)*	18.17 *(3.58)*	0.67 *(2.54)*	71°F *(22°C)*
285.35 *(212.78)*	1907	16.41 *(62.12)*	0.403 *(0.245)*	17.39 *(3.43)*	0.50 *(1.90)*	Relative humidity
190.73 *(142.23)*	1910	12.26 *(46.42)*	0.450 *(0.274)*	15.55 *(3.06)*	0.35 *(1.32)*	35%
95.54 *(71.24)*	1913	8.39 *(31.77)*	0.615 *(0.374)*	11.38 *(2.24)*	0.28 *(1.06)*	Barometer
1.53 *(1.14)*	1917	4.63 *(17.51)*	21.198 *(12.894)*	0.33 *(0.07)*	0.16 *(0.60)*	28.25" Hg *(95.67 kPa)*

Maximum torque - 1668 lb.-ft. *(2261 Nm)* at 1100 rpm
Maximum torque rise - 35.2%
Torque rise at 1521 engine rpm - 31%
Power increase at 1650 engine rpm - 7.3%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	D.E.F Consumption lb/hp.hr *(kg/kW.h)*	Temp.°F*(°C)* cooling med	Temp.°F*(°C)* Air dry bulb	Barom. inch Hg *(kPa)*
Power at Rated Engine Speed—5.6 mph *(9.0 km/h)*-Manual mode										
404.06 *(301.30)*	28494 *(126.75)*	5.32 *(8.56)*	1839	4.0	0.432 *(0.263)*	16.21 *(3.19)*	0.021 *(0.013)*	186 *(86)*	41 *(5)*	28.51 *(96.55)*
75% of Pull at Rated Engine Speed—5.6 mph *(9.0 km/h)*-Manual mode										
306.71 *(228.71)*	21354 *(94.99)*	5.39 *(8.67)*	1860	3.1	0.435 *(0.264)*	16.12 *(3.18)*	0.018 *(0.011)*	185 *(85)*	43 *(6)*	28.48 *(96.44)*
50% of Pull at Rated Engine Speed—5.6 mph *(9.0 km/h)*-Manual mode										
208.02 *(155.12)*	14221 *(63.26)*	5.49 *(8.84)*	1877	2.0	0.466 *(0.284)*	15.01 *(2.96)*	0.018 *(0.011)*	184 *(84)*	42 *(6)*	28.48 *(96.44)*
75% of Pull at Reduced Engine Speed—Auto mode										
304.96 *(227.41)*	20979 *(93.32)*	5.46 *(8.78)*	1284	3.0	0.404 *(0.246)*	17.32 *(3.41)*	0.023 *(0.014)*	186 *(86)*	43 *(6)*	28.49 *(96.48)*
50% of Pull at Reduced Engine Speed—Auto mode										
208.78 *(155.69)*	14349 *(63.83)*	5.46 *(8.79)*	1286	2.1	0.419 *(0.255)*	16.72 *(3.29)*	0.024 *(0.015)*	185 *(85)*	43 *(6)*	28.49 *(96.48)*

DRAWBAR PERFORMANCE AT
1840 ENGINE RPM-MANUAL MODE
DRAWBAR POWER AT SELECTED TRAVEL SPEEDS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	D.E.F Consumption lb/hp.hr *(kg/kW.h)*	Temp.°F*(°C)* cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
				3.1 mph *(5.0 km/h)*						
301.96	43378	2.61	1851	13.9	0.509	13.76	0.021	185	43	28.52
(225.17)	*(192.95)*	*(4.20)*			*(0.310)*	*(2.71)*	*(0.013)*	*(85)*	*(6)*	*(96.58)*
				3.7 mph *(6.0 km/h)*						
365.07	41579	3.30	1840	9.4	0.477	14.69	0.022	186	44	28.52
(272.23)	*(184.95)*	*(5.30)*			*(0.290)*	*(2.89)*	*(0.014)*	*(86)*	*(7)*	*(96.58)*
				4.2 mph *(6.8 km/h)*						
393.38	35341	4.18	1840	6.1	0.443	15.81	0.019	185	46	28.52
(293.34)	*(157.20)*	*(6.72)*			*(0.269)*	*(3.11)*	*(0.012)*	*(85)*	*(8)*	*(96.58)*
				4.7 mph *(7.5 km/h)*						
395.47	34732	4.27	1839	5.8	0.442	15.85	0.021	185	46	28.53
(294.90)	*(154.49)*	*(6.87)*			*(0.269)*	*(3.12)*	*(0.013)*	*(85)*	*(8)*	*(96.61)*
				5.1 mph *(8.2 km/h)*						
402.07	31981	4.72	1839	4.9	0.433	16.17	0.021	186	41	28.51
(299.82)	*(142.26)*	*(7.59)*			*(0.263)*	*(3.19)*	*(0.013)*	*(86)*	*(5)*	*(96.55)*
				5.6 mph *(9.0 km/h)*						
404.06	28494	5.32	1839	4.0	0.432	16.21	0.021	186	41	28.51
(301.30)	*(126.75)*	*(8.56)*			*(0.263)*	*(3.19)*	*(0.013)*	*(86)*	*(5)*	*(96.55)*
				6.2 mph *(10.0 km/h)*						
399.09	25131	5.96	1840	3.4	0.433	16.17	0.020	186	40	28.51
(297.60)	*(111.79)*	*(9.59)*			*(0.263)*	*(3.18)*	*(0.012)*	*(86)*	*(5)*	*(96.55)*
				6.8 mph *(11.0 km/h)*						
396.06	23418	6.34	1840	3.1	0.436	16.07	0.020	187	42	28.50
(295.34)	*(104.17)*	*(10.20)*			*(0.265)*	*(3.17)*	*(0.012)*	*(86)*	*(6)*	*(96.51)*
				7.5 mph *(12.0 km/h)*						
386.45	20456	7.08	1840	2.7	0.448	15.62	0.022	186	42	28.50
(288.17)	*(90.99)*	*(11.39)*			*(0.273)*	*(3.08)*	*(0.014)*	*(86)*	*(6)*	*(96.51)*
				8.1 mph *(13.0 km/h)*						
389.09	19164	7.62	1840	2.5	0.444	15.77	0.022	187	43	28.49
(290.14)	*(85.25)*	*(12.26)*			*(0.270)*	*(3.11)*	*(0.013)*	*(86)*	*(6)*	*(96.48)*
				8.7 mph *(14.0 km/h)*						
396.57	17901	8.31	1841	2.3	0.437	16.03	0.020	186	43	28.48
(295.72)	*(79.63)*	*(13.37)*			*(0.266)*	*(3.16)*	*(0.012)*	*(86)*	*(6)*	*(96.44)*

TRACTOR SOUND LEVEL WITH CAB	dB(A)
At no load at 4.5 mph *(7.4 km/h)* engine speed 1905 rpm	67.0
At no load at 4.5 mph *(7.4 km/h)* engine speed 1290 rpm	64.5
Bystander	89.0

TIRES AND WEIGHT	Tested Without Ballast
Rear Tires - No., size, ply & psi*(kPa)*	Four 710/70R42;***;11*(75)*
Front Tires - No., size, ply & psi*(kPa)*	Four 710/70R42;***;12*(85)*
Height of Drawbar	21.0 in *(535 mm)*
Static Weight with operator - Rear	19475 lb *(8834 kg)*
- Front	23785 lb*(10789 kg)*
- Total	43260 lb*(19623 kg)*

Power take-off 1000 rpm at 1730 engine rpm
Unladen tractor mass 43085 lb *(19543 kg)*

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE: To facilitate drawbar testing, the tractor was equipped with computer software that locked the transmission into the speed settings shown. These runs are denoted as Manual mode.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. This tractor fell 3.3% short of meeting the manufacturer's 3 point lift claim of 22480 lb *(100 kN)* and 1% short of the remote hydraulic flow claim of 51.5 GPM *(195 l/min)* with standard pump. The manufacturer's remote hydraulic flow claim of 72.5 GPM *(275 l/min)* with "twin priority" pump was not verified. The performance figures on this Summary were taken from a test conducted under the OECD Code 2 test procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **2175**, Nebraska Summary 1089, June 12, 2017.

Roger M. Hoy
Director

M.F. Kocher
P.J. Jasa
S.K. Pitla
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE - AUTO MODE

(Loads based on 1840 engine rpm manual mode performance runs)

DRAWBAR POWER AT SELECTED TRAVEL SPEEDS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	D.E.F Consumption lb/hp.hr *(kg/kW.h)*	Temp.°F*(°C)* cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
4.7 mph *(7.5 km/h)*										
393.51 *(293.44)*	34237 *(152.29)*	4.31 *(6.94)*	1655	5.5	0.422 *(0.257)*	16.60 *(3.27)*	0.020 *(0.012)*	186 *(86)*	41 *(5)*	28.53 *(96.61)*
5.1 mph *(8.2 km/h)*										
401.94 *(299.73)*	31600 *(140.56)*	4.77 *(7.68)*	1627	4.9	0.421 *(0.256)*	16.62 *(3.27)*	0.023 *(0.014)*	186 *(86)*	42 *(5)*	28.53 *(96.61)*
5.6 mph *(9.0 km/h)*										
402.25 *(299.95)*	28631 *(127.36)*	5.27 *(8.47)*	1659	4.2	0.424 *(0.258)*	16.50 *(3.25)*	0.019 *(0.012)*	187 *(86)*	42 *(6)*	28.53 *(96.61)*
6.2 mph *(10.0 km/h)*										
398.58 *(297.22)*	25366 *(112.83)*	5.89 *(9.48)*	1669	3.6	0.429 *(0.261)*	16.34 *(3.22)*	0.020 *(0.012)*	187 *(86)*	42 *(6)*	28.50 *(96.51)*
6.8 mph *(11.0 km/h)*										
396.03 *(295.32)*	22880 *(101.78)*	6.49 *(10.44)*	1691	3.1	0.434 *(0.264)*	16.13 *(3.18)*	0.021 *(0.013)*	186 *(86)*	42 *(6)*	28.50 *(96.51)*
7.5 mph *(12.0 km/h)*										
386.75 *(288.40)*	20276 *(90.19)*	7.16 *(11.51)*	1422	2.6	0.399 *(0.243)*	17.54 *(3.46)*	0.024 *(0.015)*	186 *(86)*	42 *(6)*	28.50 *(96.51)*
8.1 mph *(13.0 km/h)*										
389.05 *(290.11)*	18835 *(83.78)*	7.75 *(12.47)*	1416	2.5	0.395 *(0.240)*	17.73 *(3.49)*	0.022 *(0.014)*	186 *(86)*	43 *(6)*	28.48 *(96.45)*
8.7 mph *(14.0 km/h)*										
396.26 *(295.49)*	17823 *(79.28)*	8.34 *(13.42)*	1448	2.3	0.393 *(0.239)*	17.80 *(3.51)*	0.019 *(0.012)*	186 *(86)*	43 *(6)*	28.48 *(96.45)*

DRAWBAR PERFORMANCE AT
1650 ENGINE RPM-MANUAL MODE-UNBALLASTED
MAXIMUM POWER AT SELECTED TRAVEL SPEEDS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	D.E.F Consumption lb/hp.hr *(kg/kW.h)*	Temp.°F*(°C)* cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
				3.1 mph *(5.0 km/h)*						
301.95 *(225.16)*	43315 *(192.67)*	2.61 *(4.20)*	1851	13.9	0.509 *(0.310)*	13.76 *(2.71)*	0.020 *(0.012)*	186 *(86)*	43 *(6)*	28.52 *(96.58)*
				3.7 mph *(6.0 km/h)*						
364.94 *(272.13)*	41634 *(185.19)*	3.29 *(5.29)*	1839	9.4	0.479 *(0.291)*	14.62 *(2.88)*	0.022 *(0.014)*	186 *(86)*	45 *(7)*	28.51 *(96.55)*
				4.2 mph *(6.8 km/h)*						
395.01 *(294.56)*	39584 *(176.08)*	3.75 *(6.03)*	1682	7.9	0.442 *(0.269)*	15.86 *(3.12)*	0.025 *(0.015)*	186 *(86)*	45 *(7)*	28.52 *(96.58)*
				4.7 mph *(7.5 km/h)*						
392.88 *(292.97)*	39156 *(174.17)*	3.77 *(6.06)*	1669	7.7	0.444 *(0.270)*	15.79 *(3.11)*	0.020 *(0.012)*	185 *(85)*	49 *(9)*	28.52 *(96.58)*
				5.1 mph *(8.2 km/h)*						
403.59 *(300.96)*	36136 *(160.74)*	4.19 *(6.74)*	1649	6.7	0.427 *(0.260)*	16.40 *(3.23)*	0.020 *(0.012)*	185 *(85)*	48 *(9)*	28.53 *(96.61)*
				5.6 mph *(9.0 km/h)*						
406.44 *(303.08)*	32886 *(146.28)*	4.64 *(7.46)*	1650	5.6	0.424 *(0.258)*	16.52 *(3.25)*	0.020 *(0.012)*	185 *(85)*	49 *(9)*	28.52 *(96.58)*
				6.2 mph *(10.0 km/h)*						
406.82 *(303.36)*	29105 *(129.47)*	5.24 *(8.43)*	1650	4.6	0.426 *(0.259)*	16.44 *(3.24)*	0.019 *(0.012)*	186 *(85)*	51 *(10)*	28.51 *(96.55)*
				6.8 mph *(11.0 km/h)*						
404.12 *(301.35)*	26477 *(117.77)*	5.73 *(9.21)*	1650	4.0	0.428 *(0.260)*	16.37 *(3.23)*	0.020 *(0.012)*	186 *(86)*	51 *(10)*	28.51 *(96.55)*
				7.5 mph *(12.0 km/h)*						
388.24 *(289.51)*	23075 *(102.64)*	6.31 *(10.15)*	1651	3.2	0.447 *(0.272)*	15.67 *(3.09)*	0.023 *(0.014)*	187 *(86)*	52 *(11)*	28.50 *(96.51)*
				8.1 mph *(13.0 km/h)*						
398.53 *(297.18)*	21823 *(97.07)*	6.85 *(11.02)*	1650	3.0	0.437 *(0.266)*	16.03 *(3.16)*	0.021 *(0.013)*	187 *(86)*	51 *(11)*	28.50 *(96.51)*
				8.7 mph *(14.0 km/h)*						
405.76 *(302.57)*	20700 *(92.08)*	7.35 *(11.83)*	1649	2.8	0.429 *(0.261)*	16.32 *(3.21)*	0.020 *(0.012)*	187 *(86)*	53 *(11)*	28.49 *(96.48)*
				9.3 mph *(15.0 km/h)*						
408.59 *(304.68)*	19915 *(88.58)*	7.70 *(12.38)*	1651	2.5	0.423 *(0.257)*	16.56 *(3.26)*	0.020 *(0.012)*	187 *(86)*	52 *(11)*	28.50 *(96.51)*

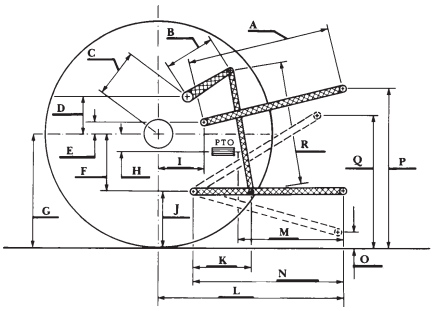
HYDRAULIC PERFORMANCE

CATEGORY: IVN	
Quick Attach: yes	
OECD Static test	
Maximum force exerted through whole range:	21739 lbs *(96.7 kN)*
	Two outlet sets combined
	Standard pump
i) Sustained pressure of the open relief valve:	2801 psi *(193 bar)*
ii) Pump delivery rate at minimum pressure and rated engine speed:	51.0 GPM *(193.1 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	47.9 GPM *(181.3 l/min)*
Delivery pressure:	2569 psi *(177 bar)*
Power:	71.8 HP *(53.5 kW)*
	Single outlet set
ii) Pump delivery rate at minimum pressure and rated engine speed:	32.5 GPM *(122.9 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	30.7 GPM *(116.3 l/min)*
Delivery pressure:	2392 psi *(165 bar)*
Power:	42.9 HP *(32.0 kW)*

HITCH DIMENSIONS AS TESTED - NO LOAD

	inch	*mm*
A	31.9	*810*
B	23.6	*600*
C	19.2	*487*
D	18.8	*478*
E	11.0	*279*
F	16.6	*422*
G	37.6	*955*
H	0.2	*5*
I	25.5	*647*
J	21.0	*533*
K	22.8	*578*
L	57.4	*1458*
*L'	63.7	*1618*
M	30.4	*773*
N	41.9	*1065*
O	9.1	*230*
P	49.0	*1244*
Q	38.6	*980*
R	44.1	*1120*

*L' to Quick Attach ends



CLAAS XERION 5000 Diesel

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